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ABSTRACT

The application of copyright laws to Computer Assisted Instruction (CAI) is not a simple matter of extending traditional literary practices because of the legal complications introduced by the use of computers to store and reproduce materials. In addition, CAI courseware poses some new problems for the definitions of educational usage. Some precedent CAI copyright arrangements exist; e.g., the formation of one's own private company to market courseware. The University of Illinois has established a policy for ownership, copyright, and royalties in its recent commercial marketing of the PLATO system. In weighing the potential negative and positive aspects of copyright law on CAI development, it seems that the benefits and drawbacks that copyright law brings must ultimately be accepted as consequences of widespread CAI usage.
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Copyright & CAI

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TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC) AND
USERS OF THE ERIC SYSTEM."

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IR005-773

ABSTRACT

The issue of copyright law as it applies to the domain of Computer Assisted Instruction (CAI) is explored. The application of copyright laws to CAI is not a simple matter of extending traditional literary practices because of the legal complications introduced by the use of computers to store and reproduce materials. In addition, CAI courseware poses some new problems for the definitions of educational usage. Some precedent CAI copyright arrangements are briefly described. The implications of copyright law for CAI facilities, academic institutions, and the evolution of CAI itself, are discussed.

It is no exaggeration of fact to say that the number of hours of daily instruction given via computer assisted instruction (CAI) now numbers in the hundreds of thousands of hours. Every indication suggests that this figure is quite modest compared to the expected growth of CAI over the next decade. For every hour of CAI instruction, somewhere between 20-200 hours of authoring time are involved. Putting these two facts together, it is evident that an enormous amount of individual intellectual effort has been invested in the production of such instruction. Given this setting, it is not surprising that the authors of CAI courseware should be increasingly interested in copyright laws as they apply to CAI materials.

Copyright is the traditional legal mechanism for ensuring an author's rights over the production or reproduction of his or her intellectual property, including any public recognition or financial benefits which derive from this. Put another way, copyright law is a formal social policy which permits the public dissemination of an intellectual product while still preserving the private ownership rights of its creator. Although copyright law is typically thought of in the context of written material, it covers all creative work including dramatical and musical productions, paintings, photographs, films, sculpture, records, and any type of broadcast. Furthermore, it not only covers the specific content of the work but also the form of expression (e.g., the typographical layout of a text, the choreography of a dance, etc.). Clearly, programming in general and CAI courseware in particular are creative activities which result in an intellectual product and hence are to be included in the broad range of copyright coverage.

While the applicability of copyright to computer software and CAI courseware seems reasonably clear-cut, the details are not. Copyright laws have evolved and been applied in the "Gutenberg Galaxy" of printed text. Computer-based information technology provides an entirely new spectrum to the traditional modes of information storage and transmission which raises various complications for the interpretation and enforcement of copyright laws. Henry (1974) has termed information technology "neopublishing" and pointed out that copyright laws are caught in the conflict of a new system of information use and dissemination with an old system of information origination. A further complication with respect to CAI courseware is that it is an activity which is carried out almost entirely within the educational community -- a domain which has, more often than not, been effectively immune to copyright infringements.

Recent activity in the commercial marketing of CAI courseware has catalyzed the precise specification of copyright law as it applies to CAI. It seems that the time is appropriate to open discussion within the CAI community

on the matter of copyright in the hope that a general policy will emerge by consensual agreement. The present paper is intended to encourage such a discussion.

COPYRIGHT LAWS: IN PRINCIPLE & IN PRACTICE

In general, copyright law is a means of regulating the distribution and utilization of information and, as such, constitutes social policy with respect to the public dissemination of information. To the author, copyright law is the legal protection provided for intellectual property (no matter what its form or mode of expression) which ensures that such property can be financially exploited in acceptable ways. Typically such protection involves the complete control over any form of duplication, distribution, publication or presentation of copyrighted material. It represents a statement of ownership and conditions for royalty payments.

Copyright laws are national statutes and hence differ in detail from country to country. However, the following general properties characterize the copyright laws of countries which follow either of the two major international copyright conventions:

1. Range of Coverage. A statement of what materials or forms of reproduction are covered by the law. There are usually no specifications pertaining to the mode in which such materials are presented.
2. Time Limitation. Copyright protection is limited to a specific time period -- usually between 20-50 years.
3. Ownership and Transfer rights. These specifications establish who is to be considered the original owner of copyrighted material and conditions of transfer of copyright ownership.
4. Copyright Privileges. The privileges of the owner with respect to the preservation of the integrity of material during reproduction or presentation and the right to collect royalties for the reproduction of the work.
5. Penalties for Copyright Infringements. The penalties associated with improper use of copyrighted material.
6. Exceptions to Copyright Infringement. These exceptions fall into three major classes: substantive part (copying some portion of a copyrighted work), fair dealing (reproduction for private, research, library, review, criticism, or reporting purposes), and educational uses (reproduction of material in the course of instruction or within a school situation).

Compared to other measures of protection (e.g., trademarks, patents), copyright is extremely simple and convenient to enact. The act of affixing the word

"COPYRIGHT" followed by the year and the name(s) of the owner to the title or first page of any material is usually sufficient to legally establish copyright. In addition, it may be necessary to register copyrighted material with an appropriate federal office, e.g., the Copyright Office.

At this point, it becomes illegal (in fact, a criminal offence since copyright law is federal) to duplicate or reproduce the material subject to the conditions and penalties as outlined above. Mooers (1976) discusses the consequences of copyright infringement for software piracy. U.S. law provides for a fine between 250 and 5000 dollars per instance of infringement. Thus distributing 50 copies of "pirated" software would count as 50 instances of infringement. Moreover, it makes no difference whether any money was involved or not; nor is ignorance (genuine or feigned) of the law an acceptable excuse.

To avoid such penalties, the user of copyrighted material must contact the stated owner of the material, obtain permission and negotiate any royalties involved. Note that it is the right of the copyright owner to refuse such permission or to stipulate conditions of usage. The practical difficulties inherent in this required procedure are obvious -- the difficulty and delay involved in identifying and locating the copyright owner. Thus, while copyright is intended to facilitate the public dispersion of materials (while preserving the originators rights), it may in some instances restrict such dispersion due to the obstacle of obtaining permission.

COPYRIGHT: THE CASE OF CAI

The problem of copyright law as it applies to the development and utilization of CAI courseware falls within two more general copyright domains; the copyright of computer software, and the copyright of educational media. Each of these domains provides special problems for copyright law.

The first domain, the copyright of computer software, is problematic because of the essentially intangible nature of computer transmission and storage. Thus, the question arises as to whether executing a copyrighted program on your data is a copyright infringement, particularly when the result may be different each time the program is executed. Does the conversion of a copyrighted program from one language to another constitute a copyright violation? Does viewing the result of a copyrighted program on a visual display screen mean a violation? Does the minor modification of the instructional logic of a program or the correction of an error, mean a copyright violation? Each of these questions depends upon the judicial interpretation of copyright law as it applies to the features of information

processing activities. Smoot (1976) discusses problems such as these in the context of the development of an international body of copyright law for software protection.

In the domain of education media, the copyright problems center around the range of media involved (e.g., broadcasting, audiovisual materials, programmed instruction, etc.) and the fair dealing/educational exceptions to copyright infringement. In so far as the ultimate use of educational materials is for the purposes of private study by a learner, this may constitute a general loophole for educational media. Some copyright law provides exemptions if material is used "in schools"; does "in school" include the use of materials for home study as in an open university system or remote CAI terminals? A full discussion of copyright and educational media in the context of British law is given by Crabb (1975).

CAI courseware inherits the problems of both these domains and in addition adds a few wrinkles of its own. CAI courseware is typically "consumed" in a non-tangible form -- namely by viewing cathode or plasma display screens. Clearly copyright must primarily protect the actual execution of courseware. CAI courseware is dynamic and usually under a constant state of modification or revision. According to copyright law, every modification, no matter how small should be authorized by the copyright owner. Furthermore, because CAI courseware is often multimedia (involving slides, audiotapes, microfiche, workbooks, etc.), a single piece of courseware may be subject to differing copyright protection considerations.

A small number of CAI projects have been commercially marketed and hence copyright/royalty agreements have been worked out. The nature of these agreements has depended upon the particular circumstances of each project and different approaches have resulted. We will briefly describe four such projects; a more detailed case of study of these projects (and others) is provided by Hunter et al. (1975).

The Stanford drill & practice programs in arithmetic and reading were developed principally due to the efforts of P. Suppes and R. Atkinson. This project probably represents the most thoroughly tested and most empirically supported CAI effort to date. The commercial distribution of the Stanford courseware is handled by Computer Curriculum Corporation, which is owned in part by P. Suppes. This suggests one approach to CAI ownership; the formation of your own private company to market your courseware. It is unlikely that many academics have the necessary business skills to follow this approach.

W.F. Pillsbury (Knox College, Illinois) developed a highly successful computer based accounting course which was

commercially marketed by the South-Western Publishing Corporation. The royalty agreement covered the student handbook and teaching guide while the actual computer programs and documentation were distributed at no cost. Royalties were paid directly to Pillsbury. This arrangement follows the traditional royalty and copyright practices of the publishing industry.

The Huntington Computer Project resulted in the production of a number of very popular simulation packages in various subjects. Originally non-exclusive copyright licenses were awarded to both Digital Electronics Corporation (DEC) and Hewlett-Packard for marketing the Huntington simulation packages, but later this was changed to an exclusive license to DEC. The copyright arrangement between DEC and National Science Foundation (NSF) who funded the Huntington Project was that all royalties should be paid to the State of New York and then be funneled back to the Huntington Project to support future development. Here we see an example of an arrangement in which ownership rests in the hands of a funding institution (NSF), a computer company (DEC), and the Huntington Project.

Project REACT is a training package for school teachers and administrators using BASIC and developed by the Southwestern Regional Education Laboratory (SWREL). This package (actually there are 3) is commercially marketed by Technica Education Corporation with royalties to be shared between SWREL and the U.S. Office of Education which funded the project. This arrangement is different from the Huntington one in that here some portion of the royalties are going back to the funding organization itself.

While we have not discussed the details of these four examples, it should be evident that each one represents a somewhat different approach to the copyright of computer based educational materials. From the point of view of establishing a common or uniform precedent for the copyright of CAI courseware, previous arrangements are not helpful. However, the recent commercial marketing of the PLATO system and the accompanying copyright arrangement may set a standard or precedent for future CAI copyright agreements. For this reason, we shall consider the PLATO agreement in detail in the next section.

CAI COPYRIGHT: A PRECEDENT

A precedent for the copyright and ownership of CAI courseware has been established by the recent commercial marketing of the PLATO system developed by the University of Illinois. Because the PLATO system is the largest CAI system presently in use (as well as being the first major CAI system), this agreement merits some discussion. Here are some of the features of the University of Illinois policy of

ownership, copyright, and royalty for the PLATO system:

1. Courseware covers all materials developed for the purpose of presenting information via the PLATO system including all software and ancillary materials used in courses. This includes course syllabi, audio-visual materials, course workbooks, courseware evaluation material, and courseware management material.

2. Authors are categorized as either commissioned or noncommissioned (students or employees of the university), other authors (not affiliated with the university), participating institution authors, or joint venture institution authors. The ownership, royalty percentages, release rights, and the responsibility for error correction are different for each of these five classes of authors. For example, noncommissioned authors have the sole right to designate whether courseware is ready for distribution, receive 75% of the gross royalties, and are responsible for the correction of errors. In the case of commissioned authors, however, the university reserves the rights to decide when courseware is ready for release, the responsibility for error correction, and the commissioned author receives 40% of the gross royalties.

3. The university has first option to act as a distributor or marketer for all courseware developed.

4. The university has the right to prepare foreign language translations of developed courseware and one half of the royalties from such translations may be used to recover the translation costs.

The commercial agreement follows these conditions along with certain marketing prerogatives allowed the commercial vendor. Royalty rates established by the commercial vendor are dependent upon the number of student contact hours and the level of student as follows:

2 cents per student contact hour for elementary/secondary school level
2.75 cents per student contact hour for undergraduate & Masters level
4 cents per student contact hour for doctoral and professional levels

Separate royalty rates are established for ancillary materials in terms of percentage of net proceeds from sales. These rates are as follows:

Workbooks

Elementary/Secondary	5%
College/University/Other	10%

Textbooks:

Elementary/Secondary	5-10%
College/University/Other	10-15%
Professional	15-18%

Audiovisual	10%
Other	5%

Both the royalty rates on courseware and ancillary materials are subject to further considerations, e.g., whether marketed in the U.S. or not. All marketing responsibility is retained by the vendor. Finally, the correction of errors and defects in courseware remains the obligation of the university.

The PLATO agreement sets a precedent for CAI copyright in a number of areas. First, and most importantly, the ownership of all courseware and ancillary materials is vested in the University of Illinois on behalf of authors. Thus, the precedent set by the PLATO agreement is institutional ownership rather than the traditional individual ownership. Secondly, classes of authorship (principally commissioned and non-commissioned) as well as classes of institutional participation have been specified which determine the percentage of royalty rates, release rights, and error correction responsibilities. Thirdly, royalty rates for courseware have been specified in terms of student contact hours and in terms of a percentage of net sales for ancillary materials. While specific computer based materials may necessitate particular modifications, this agreement could serve as a general model or format for subsequent CAI copyright arrangements.

COPYRIGHT: IMPLICATIONS FOR THE EVOLUTION OF CAI

The formalization of ownership rights via copyright laws is an indication of the growing acceptance (or institutionalization) of CAI as a component of mainstream educational practice. The establishment of standard copyright agreements will likely encourage commercial publishers or computer vendors to become involved in the marketing of CAI courseware. The establishment of royalty arrangements and the commercial marketing of CAI courseware could possibly lead to the emergence of the professional courseware author. This would result in the competitive production of CAI courseware and probably a greater range in the quality and quantity of courseware available. In this respect the production of CAI courseware could parallel the development of commercial recording, radio and television. (One can just imagine the top ten drill & practice programs for the week.) In general this course of events would seem likely to benefit both authors (who receive financial reimbursement) and students (who have a greater selection of courseware).

Although CAI authors may be anticipating that their courseware will come under the protection of federal copyright legislation, the preceding discussion suggests that for the immediate future authors will have to look after their own concerns. Since a large number of authors

are employed in educational institutions of various types, the problem of protecting authorship is also complicated by the various institutional mandates and precedents which have governed the treatment of creative intellectual endeavors.

It is easy to identify within an educational institution three sources of potential conflict related to the development, use, and distribution of CAI materials. The institution itself, generally, has a mandate for the education of some segment of the population, while the author must clearly protect his or her own professional integrity. Caught between these two factors, are the students having as their primary interest access to course material in a form as conducive to learning as possible. Unlike most commercial institutions which require employees to turn over any intellectual efforts, related directly or indirectly to their sphere of commercial production, educational institutions have traditionally allowed their staff to retain the rights of ownership and royalties. The clearest example of this historical position is in the authorship of books by university staff. However, perhaps because of dwindling budgets during the last eight years, educational institutions are more frequently accounting the institutional costs of supporting such creative efforts. Thus, it is conceivable that more frequently institutions will claim a share of distribution and royalty rights traditionally held by an author. This has certainly been the case with a number of past arrangements for the marketing of CAI materials as discussed above. Clearly, conflicts will develop particularly when an institution develops policy after the need arises, when professional integrity is in jeopardy, and when traditional patterns of lecture presentation are distorted as would occur with the use of CAI.

Obviously, accepting copyright as a matter of course necessitates certain actions on the part of the administrative bodies of institutions involved in the development and use of CAI. As far as development is concerned, appropriate policies must be established (such as that of the University of Illinois) covering the nature of ownership and royalties for courseware developed at that institution. With respect to the usage of CAI, the number of student contact hours for all copyrighted courseware must be monitored, so that appropriate royalty payments can be made. This must be associated with the necessary administrative procedures for payment of accumulated royalties to source institutions and authors.

Any policy which is to be established by an educational institution may have to come to grips with such problems as noted below:

1. Since authors may continually modify and improve their CAI course material, at what time, if ever, and under

what conditions must a course enter the public domain? Since many educational institutions have proclaimed secret work as contrary to their mandate of producing public knowledge, they could argue that at some point a CAI course must be released for use within the institution. It could also be argued that the CAI course should be available at some time for use within the institution because of the direct and indirect support the institution has given towards its development. However, premature release of a CAI course, which may contain inaccuracies, would jeopardize the professional integrity of the author. Furthermore, after some period of time a course might have inaccuracies due to the changing knowledge in the field, and again the professional integrity of the author is in jeopardy. The problem can be compounded if no provisions are made with regard to use of the course material when the author moves to a different institution.

2. Under what conditions, and at what time, will a CAI course be released for use within an institution if the work has been done by graduate students as part of their research thesis? Traditionally, the accomplishments of graduate student research work have been embodied in the thesis to which, in most cases, the graduate student holds the right of royalty should the opportunity arise. The point is not so clear when a CAI course is involved, although certainly the course should not be released until the students have fulfilled their degree requirements or exceeded the time limit for graduation. If the latter should be the case, should the students have the option of having their names deleted as the authors of the course?
3. Frequently, CAI material is developed by two or more authors agreeing on an ad hoc basis to share the burden of the work. In this case it is clear that an understanding must be reached between the authors defining their obligations to develop and maintain the course as well as their ownership rights. This problem can be compounded several fold when one of the authors is a graduate student.
4. Usually authors develop a course which will help reduce some of their current lecturing load. In such circumstances, can an administrative official assign another staff member to the current course work of the author and request the CAI facility to make the author's work available to other staff members? Such solutions, to enable a poor instructor to be more productive to a teaching department, could become more palatable in the light of the increasing legal problems encountered in releasing poor and incompetent staff members.
5. Some educational institutions allow students to register in courses of independent study guided by an

instructor. Can the instructor assign the student to take a CAI course created by an author who is using the same course as a major part of regular instructional activities? If this is allowed, the procedure of independent study becomes a procedure by which the author's current instructional activities can be bypassed. Yet, from the student's point of view, the ability to access the course may be most useful to his or her own learning objectives.

Some of the problems associated with the ownership and use of CAI materials within an educational institution fall directly on the CAI facility. Here are some examples of problems which can develop:

1. If a CAI facility at institution 'A' releases a course to a CAI facility at institution 'B', can an instructor at institution 'B' claim that student access to the course be made only through formal registration in his or her course? Clearly, if this is allowed it permits the instructor a method of building up a student load for the course even though the instructor contributed nothing to the development of the course.
2. Who is allowed to request a copy of a CAI course from the CAI computer system? Can ancillary material such as slide, graphic, and audio material be released, or will release of such material be subject to the same policy as the release of course code? Clearly, the CAI facility must establish some policy on unauthorized access, and when access is made available as part of the computer software, controls built directly into the software are required. The CAI facility is caught among the demands of the institution, the author, and the student.

These considerations point out some of the various issues and costs of applying copyright to CAI activity. Developing the necessary administrative policies and procedures for royalty payment is one aspect of the overhead copyright involves. So are the problems involved with obtaining permission from an owner to modify copyrighted courseware. This may discourage the rapid dispersion of CAI materials, although transfer of CAI courseware has never been of such a magnitude to create problems. Another expected overhead of copyright is the inevitable legal cases arising from infringements and the requirement for judicial interpretation and enforcement of copyright law. In weighing the potential negative and positive aspects of copyright law on CAI development, it seems that the benefits and drawbacks that copyright law brings must ultimately be accepted as a consequence of widespread CAI usage. The consequences of no copyright of CAI courseware are no legal protection for intellectual initiative, no guarantee of financial reimbursement, and no control over the propagation and

alteration of courseware. This is clearly a condition which would not encourage the development of high quality CAI materials.

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APPENDIX I

This Appendix summarizes selected parts of the Canadian Copyright Rules (The Copyright Rules, Revised Statutes of Canada , Chapter C-30). The numbers correspond to the appropriate subsections of the Rules.

2. Definitions. Works specifically defined (and hence covered by the Rules) are artistic work (including painting, drawing, sculpture, craftsmanship, architectural works, engravings, photographs), books, cinematographs, dramatic works , and musical works.
3. Definition of Copyright. " For the purposes of this Act, 'copyright' means the sole right to produce or reproduce the work or any substantial part thereof in any material form whatever to perform, or in the case of a lecture to deliver, the work or any substantial part thereof in public..."
5. Term of Copyright. Generally the life of the author plus 50 years after the authors death.
17. Infringement Exceptions.
 - (2a) fair dealing
 - (2b) use of artistic molds, casts, sketches, models, or plans
 - (2c) making or publishing of drawings, photographs, of a work displayed in a public place
 - (2d) publication of collections bona fide for use in schools
 - (2e) newspaper or journalistic reports, reviews
 - (2f) public recitations
 - (2g) public performances at fairs
 - (3) No church or school shall be liable to pay any compensation to the owner of any musical work in furtherance of religious or educational objects.
- 19 (5). Royalty rates. Royalty rate is 2 cents for each playing surface of each record and 2 cents for each such perforated roll or other contrivance.
25. Infringement Penalties.
 - (1) Any person who knowingly makes for sale, lets for hire, distributes copies to such an extent as to affect prejudicially the copyright owner, or imports into Canada for sale/hire, is liable upon conviction to a fine not exceeding 10 dollars for each separate transaction but not exceeding 200 dollars, and in the case of a second or subsequent offence, either to such fine or imprisonment for a term not exceeding 2 months.
 - (2) possession of any plate for making infringing copies is liable to fine not exceeding 200 dollars or 2 months imprisonment
 - (3) performance of copyrighted material in public for profit is liable to fine not exceeding 250 dollars
 - (5) suppresssion of title, name of author, or the making of changes without written consent of author is liable to fine not exceeding 500 dollars and 4 months imprisonment.

APPENDIX II

This appendix illustrates the details involved in actually registering a copyright for CAI courseware in Canada. The Copyright Office provides two separate forms for registering a copyright; one for published works and the other for unpublished works. In either case, the work must be categorized as either literary, musical, artistic or dramatic. The blank form for published work is illustrated in Figure 1.

Thus in order to register a copyright, it must be specified whether the work is published or unpublished and which of the categories it belongs to. Both of these specifications are problematic in the case of a CAI program. It is not clear under what conditions a CAI course would be considered "published", nor whether it should properly be considered a literary, dramatic, or artistic production in so far as it combines elements of all three categories.

A completed copyright registration certificate for a CAI program developed at the Division of Educational Research Services is shown in Figure 2. The program was registered as an unpublished, artistic work as these categories seemed the most appropriate according to our interpretation of the copyright rules.

FIGURE 1

FORM 1

APPLICATION FOR REGISTRATION OF COPYRIGHT IN A PUBLISHED WORK

I, (we) _____
Here insert full name and full address of proprietor(s)

hereby declare that I am (we are) the owner(s) of the Copyright in the original

_____ work
(Here insert: literary, dramatic, musical or artistic, as the case may be)

entitled _____
Here insert title only (no descriptive matter).

by _____
Here insert full name and full address of author(s)

and that the said work was first published by the issue of copies thereof to the public on the

_____ day of _____ 19 _____
month

in the _____ of _____
(City, town) (Province, State, Country)

and I (we) hereby request you to register the Copyright of the said work in my (our) name(s) in accordance with the provisions of the Copyright Act.

I (We) forward herewith the fee of \$10.00 for the examination, registration and issue of a certificate of registration of copyright.

Dated at _____ this _____ day of _____ 19 _____
City, town month

Signature(s) (See Rule 33)

The Commissioner of Patent
 The Copyright Office,
 Hull, Canada,
 K1A 0E1



Consumer and
Corporate Affairs

Copyright
Office

Certificate of
Registration

Consommation et
Corporations

Bureau du
droit d'auteur

Certificat
d'enregistrement

File No. 179801

I hereby certify that the copyright in the work
described below has been registered as follows
Unpublished Artistic

Title

"A LEARNER CONTROLLED APL COURSE"

Author

Greg P. Kearsley, c/o
Division of Educational Research
Services, The University of Alberta,
Edmonton, Alberta,

Serial Number

273159

Register

174

Date

December 16, 1976

Owner

Greg P. Kearsley and the
Division of Educational Research
Services, The University of Alberta,
Edmonton, Alberta

Je certifie que le droit d'auteur sur l'œuvre décrite
ci-dessous a été enregistré comme suit:

Titre

Auteur

Numéro d'ordre

Registre

Date

Propriétaire

GIVEN under the Seal of the Copyright Office
at Hull, Quebec, on December 16, 1976

DONNÉ sous le Sceau du bureau du droit d'auteur
à Hull, Québec, le

L. E. Campbell

Registrar • Registraire

Attesting Officer • Certificateur

B. J. [Signature]